



# Identification and prioritization of postharvest issues faced by potato growers

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## General Note



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## ABSTRACT

Olericulture is an important sub sector of agriculture which holds a major domestic and export market. Agro-climatic conditions of Pakistan are favourable for growing more than 40 different kinds of vegetables. But during harvest season, farmers lose a heavy amount of its product in developing countries especially in Pakistan. It's reported that 40 to 50% vegetables in the developing countries are lost before consumption. This study was designed to identify and prioritize the problems of potato growers regarding postharvest issues. Tehsil Nowshehra-Virkana, district Gujranwala was selected as study area as it is one of the main vegetables growing tehsil of the province. A sample size of 144 respondents was selected purposively from the tehsil. The data were collected with the help of well-structured and pre-tested interview schedule. The collected data were analysed through Statistical Package for Social Sciences (SPSS). These findings showed that the most prominent reasons of postharvest losses were non availability of extension services; high wages of labour; lack of technical knowledge among farmers; poor transportation facilities; high cost of cold storing of the vegetables; and inadequate knowledge about cold storage of potato are the major constraints hindering the progress of vegetable sector. Therefore, it is suggested that disease free and improved varieties should provide at field level among potato growing in-order to reduce the postharvest losses. Government and private agencies should subsidize storage facilities and should

also facilitate in-case of difficulty after storage period. A strong linkage among extension agencies, potato growers, government interests, and public/private information sources are necessary for reducing the postharvest losses of the farmers.

**Keywords:** Identification; prioritization; postharvest losses; potato growers.

## 1. INTRODUCTION

Potato (*Solanum tuberosum* L.) is the world's most consumed non-grain food which has a leading part in food security [1]. The potato is a starchy, tuberous crop from Solonacea family (the perennial night shade family). It is also considered as 4<sup>th</sup> most important staple food after rice, wheat and maize in the world [2]. The overall estimated yield of potato in the world is about 321 million tons and China being the major contributor produces 72 million tons followed by Russian Federation and India with yield of 35.7 and 26.2 million tons respectively. The demand for potato in the international market is one the rise and all the major exporting countries are trying to increase the yield and as a reciprocal increase their share in world market [3]. In Pakistan, potato is appreciated crop for both farmers and consumers and the fourth most important crop by volume of production. The area under potato cultivation is 127.7 thousand hectares with an annual production of 3726.5 thousand tones which is fulfilling the needs of the whole country [4]. For the past 40 years, it is observed that half of the horticultural crops which are sown in developing countries are lost before consumption. The main reasons for this loss are a lot of cleaning, drying and decay in the handling after harvesting [5].

The vitamins found in potatoes are ascorbic acid, thiamine, riboflavin and niacin. Among others ascorbic acid is the main vitamin present as dietary antioxidant, which is vulnerable against heat and light thus considered as major index of quality deterioration duration storage [6]. Optimum range for its specific produce is very much critical to avoid various disorders like, chilling injury, freeze injury, and the most important being potato specific low temperature sweetening etc. Potato storage under low temperature is employed to extend the postharvest storage period by extending the natural dormancy through an imposed dormancy. Generally in commercial storage, after curing (stimulation of suberization and wound healing) tubers are purposely stored at 3-5°C for seed, at 6-9°C for fresh market and at 10-15°C for processing however, their storage temperature is largely related with the undesirable hexose accumulation termed as low temperature sweetening [7].

For the conservation of quality of potatoes it is necessary to make the handling practices better because these are the main steps for minimizing the post-harvest losses. Different handling practices comprise of wrapping, pre-treatment, pre-cooling, washing with water and categorization. Packaging is done to shield the produce from mechanical damage and adulteration through marketing. The other benefits of this are to overcome the moisture loss, helps in chemical handling and ethylene absorption [8]. Potato stored under different light types showed variable physiological responses. The effect of indirect sunlight, fluorescent light, storage in darkness under room temperature and storage in darkness under refrigerated conditions was investigated for 14 days on the total glycol alkaloid content of potato tubers [9].

In Pakistan farmers are facing financial crises and they are doing their best to overcome this problem. To assist them in their struggle and also to enhance the economy of the country, the development of agriculture based information technology is required which can help to enhance their agricultural production [10]. Economically potato is one of the important vegetable for farmers in Pakistan. Also, it is among major horticultural export commodities of the country. Developing countries need vertical improvement and disease management to increase potato production which is less than developed countries. Potato consumption is also increasing with time in developing countries because it fulfils the demand of food as an alternative of cereal crops [11]. Carbohydrate makes the potatoes, a good source of energy. It is also enriched in quality protein which is well matched to human body requirements. A single average potato has around ½ of daily requirement of vitamin C [12]. Potato starch has distinctive textural properties. In various food materials it is used to make gravy as a thickener or gelling agent [13].

## 2. RESEARCH METHODOLOGY

Nowshera Virkan is a tehsil and large city west of the industrial city of Gujranwala, Punjab, Pakistan. It is selected as study area as it is one of the main vegetables growing tehsil of the province. It consists of 25 total union councils (UCs). Out of which 144 respondents were selected purposively. In order to collect required data an interview schedule was developed. To check the reliability and validity of interview schedule it was pretested with 20 respondents who were actively engaged in potato cultivation. The important step was to conduct interviews of respondents. The respondents were interviewed at their farms and home and also in auction-centre (mandi). The collected data were statistically analyzed with the help of Statistical Package for Social Sciences (SPSS). Descriptive statistical measures i.e. percentages, frequencies mean and standard deviation were calculated to interpret the results, draw

conclusions and formulate suggestions. To check the relative ranking of different factors, their scores were calculated through multiplying the score value allotted to each category with frequency count. Means were calculated as sum of values divided by number of observations.

### 3. RESULTS AND DISCUSSIONS

#### Impediments Regarding Postharvest of Potatoes:

Care at postharvest is necessary to avoid losses after harvesting of potatoes. It mainly include handling, processing and storage of potatoes. In this section respondents were asked about the handling and packing of potatoes. For the identification of postharvest problems, growers were asked questions which were arranged through Likert scale with the levels of five values that were 1= very low, 2= low, 3= medium, 4= high and 5= very high. The data containing responses of potato growers regarding postharvest (handling and packing) of potatoes are given in the Table 1.

**Table 1** Frequency, mean, standard deviation and percentage of various impediments regarding postharvest (handling and packing) of potatoes

Impediments	Frequency	Mean	S.D	Percentage
Awareness about proper stage / time of harvesting	59	3.08	1.022	40.9
Awareness about grading of potato	68	3.24	1.142	47.2
Awareness about packing of potato	79	3.06	1.353	54.8
Have knowledge regarding labelling	115	3.33	1.161	79.8
Non Availability of extension services about production and guidance	119	3.52	1.171	82.6
Availability of skilled / trained labor	87	3.31	1.082	60.4
High wages of labor	105	3.41	1.174	72.9
Labor shortage	87	3.36	1.045	60.4
Poor roads	97	3.35	1.090	67.3

(Scale: 1= Very Low, 2= Low, 3= Medium, 4= High, 5= Very high)

Data mentioned in the Table 1 depict that most prominent problem was non availability of extension services about production and guidance (mean=3.52, 82.6). High wages of labor (mean=3.41, 72.9) followed by poor roads (mean=3.35, 67.3). Similarly, labor shortage and availability of skilled labor were same level constraints in this table as they had same values 60.4%. Awareness about packing of potato 54.8% and awareness about grading of potato 47.2% had 6<sup>th</sup> and 7<sup>th</sup> position in constraints table respectively. Awareness about proper stage of harvesting was the least (40.9%) constraint because almost every farmer has well information about this. The results were similar to those of [14] who concluded that factors responsible for postharvest produce losses were poor pre harvest measures, crude harvesting procedures, dumping produce, packaging, improper transportation, improper grading and storage. This shows that extension services regarding technical production and guidance, high wages of labor and poor roads were the leading impediments regarding postharvest of potatoes. The respondents said that cost of production is increased by using labor. The lowest problems showed that respondents were not taking more interest in packing of potatoes because they mostly sale their produce in near market.

#### Storage (dry storage and cold storage):

Storage plays a vital role in vegetable industry because vegetables have short life after harvesting. The shinning and life of vegetables can be maintained through storage. Likert scale was used with five levels 1= very low, 2= low, 3= medium, 4= high and 5= very high for determining storage problems. Impediments regarding storage of potatoes are given in the Table 2.

**Table 2** Frequency, mean, standard deviation and percentage of various impediments regarding storage (dry storage and cold storage) of potatoes

Impediments	Frequency	Mean	S.D	Percentage
Non availability of storage facility from Govt.	121	3.50	1.198	84.0

Inadequate knowledge about cold storage of potato	119	3.45	1.191	82.6
High cost of cold storage	129	3.54	1.244	89.5
Knowledge regarding dry storage of potatoes	97	3.06	1.206	67.3

(Scale: 1= Very Low, 2= Low, 3= Medium, 4= High, 5= Very high)

Table 2 reveals that highest mean (3.54) of high cost of cold storage of potatoes. Non availability of storage facility from Govt. had second rank (mean=3.50, 84.0%) in impediments list. Inadequate knowledge about cold storage of potato (mean=3.45, 82.6%) and Knowledge regarding dry storage of potatoes (mean=3.06, 67.3%) had 3<sup>rd</sup> and 4<sup>th</sup> rank respectively. Above results were little bit similar to those of [8] who stated that proper cold storage is necessary for the reduction of postharvest losses. High cost of storage and lack of awareness about dry storage were the main impediments of storage of potatoes. The situation is that storage is the major issue regarding marketing because potatoes remain safe for long duration. Respondents reply that there are no storage facilities provided by government. Due to costly and rare private storage they have not be able to store their produce. Some respondents which have direct link with retailer said that they store their produce only in respective season with supposition of more earning. Potato growers were most familiar with dry storage as compared to dry storage.

#### 4. CONCLUSIONS

It is concluded on the basis of findings that more than half of the respondents were facing a lot of problems regarding postharvest issues. . In case of postharvest, main problems were unawareness about handling, packing, labelling and high wages of labor. Poor roads were also the main part of constraints regarding postharvest. Regarding storage of potatoes, it is concluded that storage is necessary because it is important both seed and ware potatoes as it helps reduce and prevents processing losses if handled correctly. High cost of cold storage and inadequate knowledge regarding dry storage of potatoes were the main problems. In the context of postharvest, most prominent problem was non availability of extension services about production and guidance (82.6%). High wages of labor (72.9%) followed by poor roads (67.3%). Similarly, labor shortage and unavailability of skilled labor were same level constraints in this study as they had same values 60.4%. Awareness about packing of potato 54.8% and awareness about grading of potato 47.2% had 6<sup>th</sup> and 7<sup>th</sup> position in constraints respectively. Awareness about proper stage of harvesting was the least (40.9%) constraint because almost every farmer have well information about this. Regarding storage of potatoes most common problem was high cost of cold storage of potatoes (89.5%). Non availability of storage facility from Govt. had second rank (84.0%) in impediments. Inadequate knowledge about cold storage of potato (82.6%) was severe problem than knowledge regarding dry storage of potatoes (67.3%).

#### Recommendations

Finance shortage appeared as common problem. Therefore, government and private agencies should provide subsidies for farmers in inputs especially in case of fertilizer and pesticide to overcome the high cost of inputs. Government should take initiative to ensure the availability of inputs in time and at affordable rates. Farmers should be facilitated by minimizing the monopoly of dealers and also by assurance of price checking according to Price Control Act. Therefore, government and private agencies should take solid steps to ensure the availability of these chemical in pure and according to EPA standards. Farmers should be aware of IPM and IWM to ensure the environmental standards. Therefore, extension agencies should pay their role efficiently in the adoption of cultural control methods for pest and weed management. Linkage or communication between potato growers and extension agents should be improved. There is a dire need to ensure the standards for growing material by Govt. and private sector. Easily availability of disease free and improved varieties should be provided at small scale or especially potato growing areas. Government and private agencies should provide subsidize storage facilities and should take steps to reduce difficulty after storage period.

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#### Conflict of Interest:

The authors declare that there are no conflicts of interests.

#### Peer-review:

External peer-review was done through double-blind method.

**Data and materials availability:**

All data associated with this study are present in the paper.

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